

# **Air Quality In Utah**

**Presentation to the Utah State Legislature**

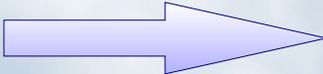
**February 7, 2008**

**Prepared by the Office of Legislative Research and General Counsel**

# Outline

- State and Federal Regulation
- Air Pollution -Types, Sources, Health Hazards
- Pollution Control Strategies

# State and Federal Regulation

Clean Air Act  EPA

- Sets national ambient air quality standards for six criteria air pollutants
- Identifies hazardous air pollutants and regulates by the source category
- Delegates or revokes primacy to a state
- Approves state implementation plans
- Penalizes states for failing to meet pollution limits

# State and Federal Regulation

Air Conservation Act  DAQ

- Prohibited by statute from making rules more stringent than federal regulation
- Monitors and measures air pollutants
- Issues construction and operating permits to pollution sources
- Develops a state implementation plan
- Enforces the plan

# Air Pollution - Types, Sources, Health Hazards

## EPA “Criteria” Pollutants

- Carbon Monoxide (CO)
- Lead (Pb)
- Nitrogen Dioxide (NO<sub>2</sub>)
- Sulfur Dioxide (SO<sub>2</sub>)
- Ozone (O<sub>3</sub>)
- Particulate Matter (PM<sub>10</sub> & PM<sub>2.5</sub>)

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# Air Pollution - Types, Sources, Health Hazards

## Sources

- **Point**
  - Larger stationary industrial or commercial facilities (power plants, steel mills, etc.)
  - Accounted for on a facility basis
- **Area**
  - Smaller stationary sources (home heating, agricultural burning and harvesting, construction, wildfires, etc.)
  - Accounted for by class
- **Mobile**
  - On-road (cars and trucks)
  - Off-road (construction equipment, lawn mowers, trains, aircraft, etc.)

# Carbon Monoxide (CO)

- Colorless, odorless, gas
- Sources - burning gasoline, wood, natural gas, etc.
- Health hazard - reduces ability of blood to transport oxygen and is particularly hazardous to those with heart, circulatory, and lung problems

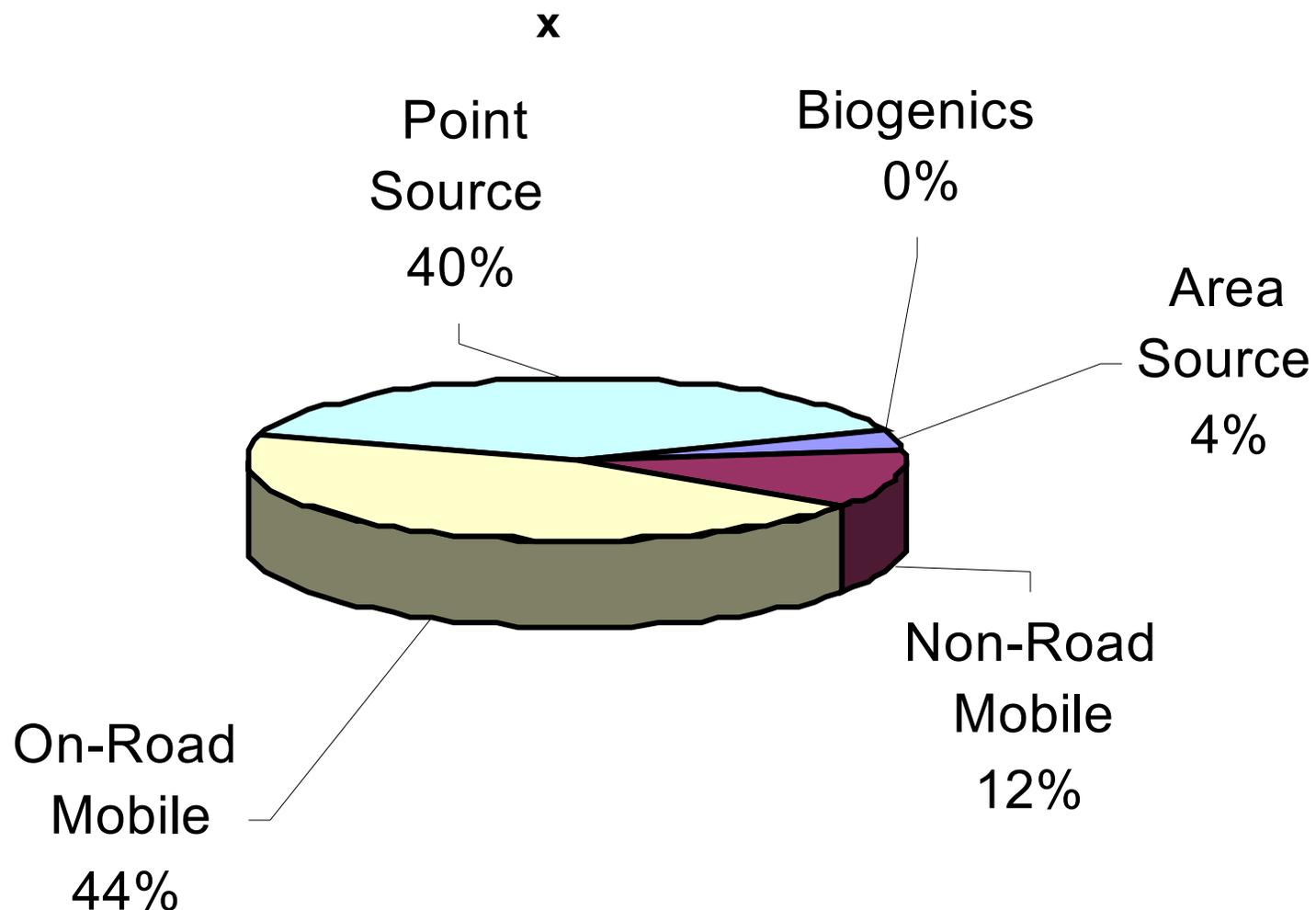
# Lead (Pb)

- Exists primarily as particulate matter
- Sources - paint, smelters, lead storage batteries, (burning gasoline prior to unleaded gasoline mandate)
- Health hazard - damages nervous system and digestive system

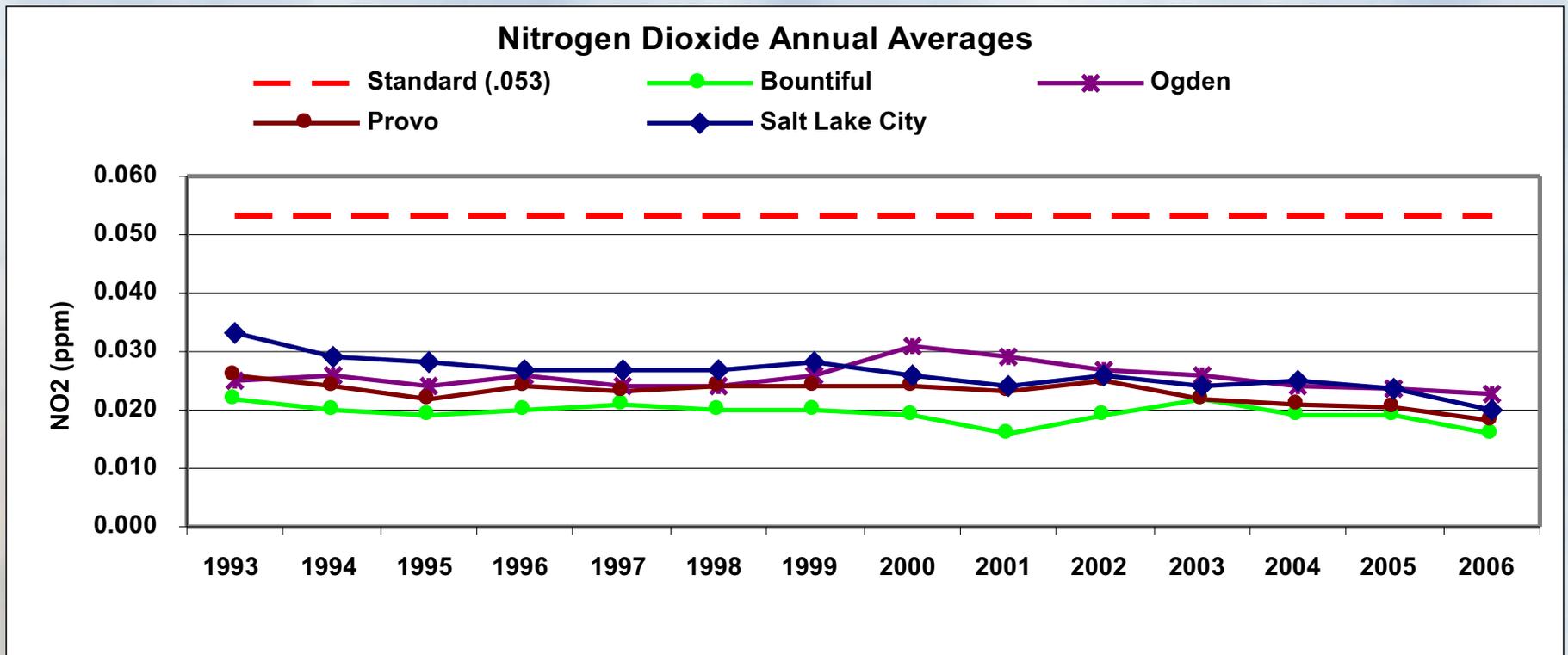
# Nitrogen Dioxide (NO<sub>2</sub>)

- One component of NO<sub>x</sub> (smog forming chemical)
- Sources - burning gasoline, natural gas, coal, oil, other fuels.
- Health hazard -lung/respiratory system damage
- Ingredient of acid rain

# NO<sub>x</sub> Emissions Inventory



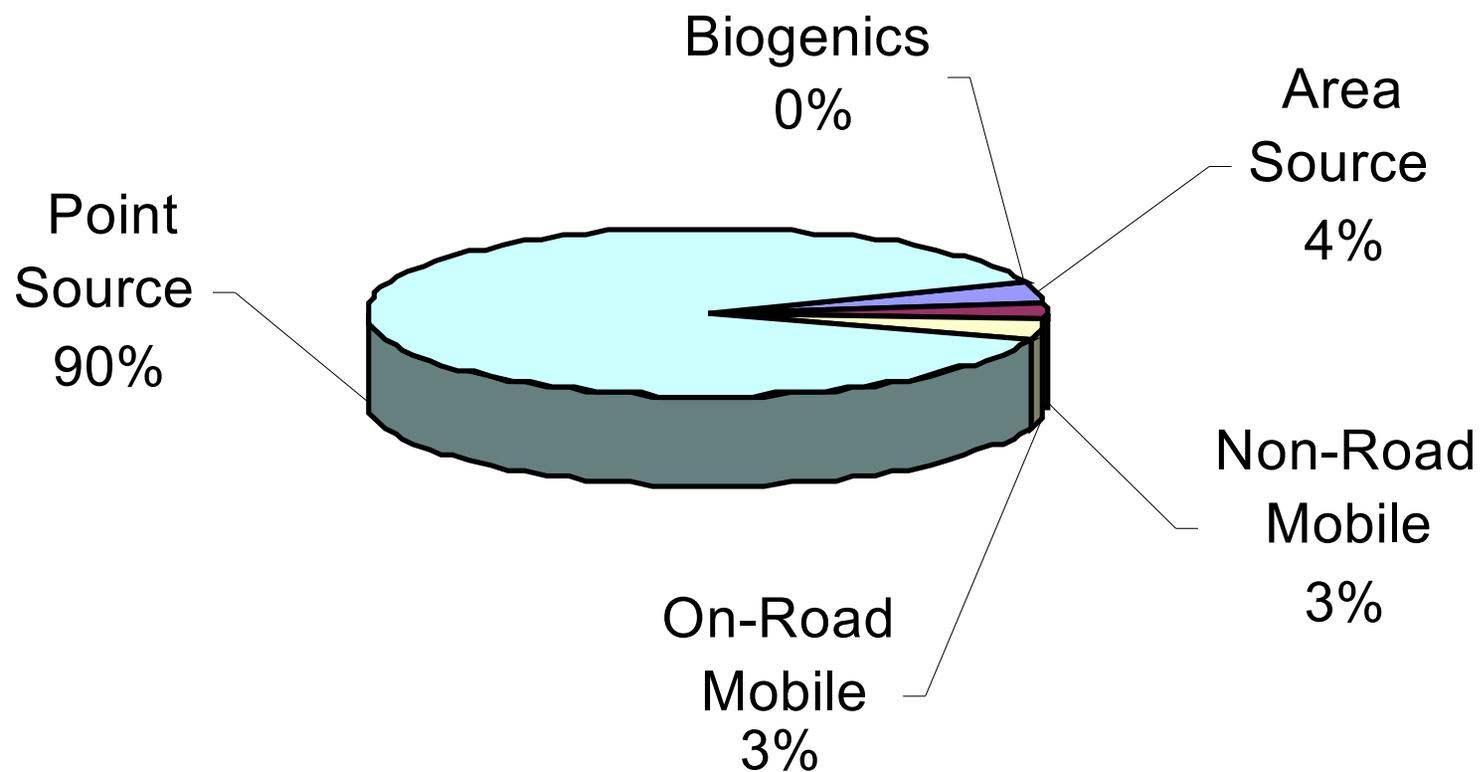
# Nitrogen Dioxide (NO<sub>2</sub>)



# Sulfur Dioxide (SO<sub>2</sub>)

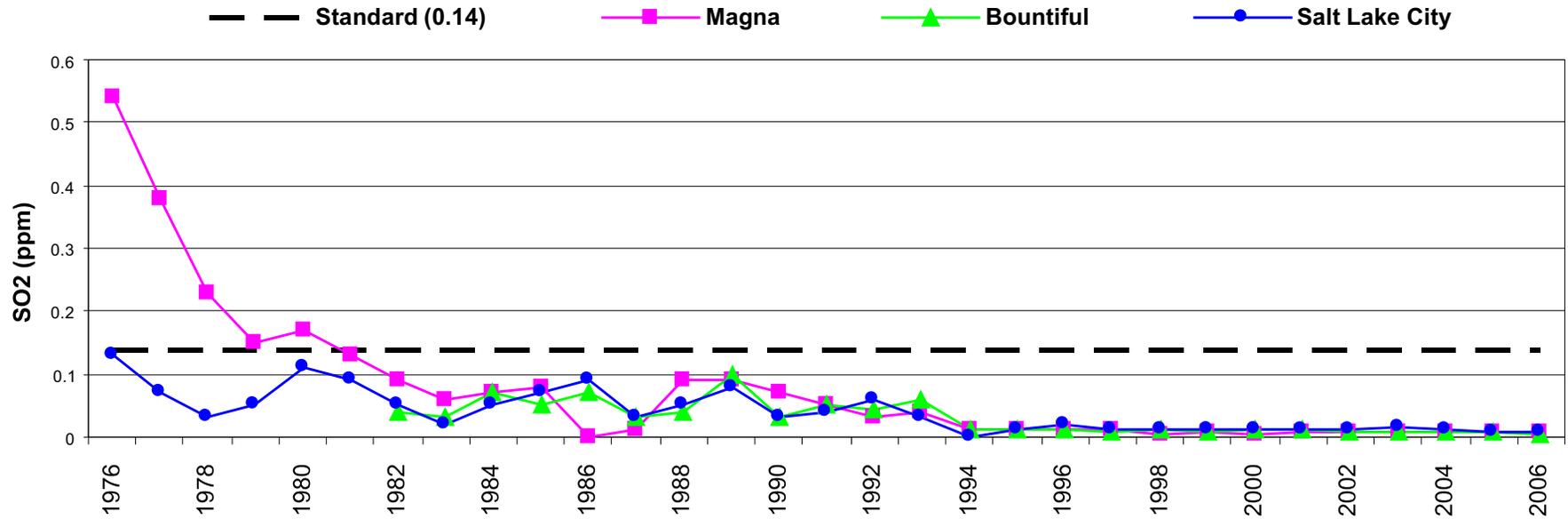
- Sources - industrial processes, burning of coal, oil, diesel, gasoline
- Health hazard - lung and respiratory problems
- Ingredient in acid rain

# So<sub>x</sub> Emissions Inventory



# Sulfur Dioxide (SO<sub>2</sub>)

Sulfur Dioxide 2nd Highest 24-hr Values



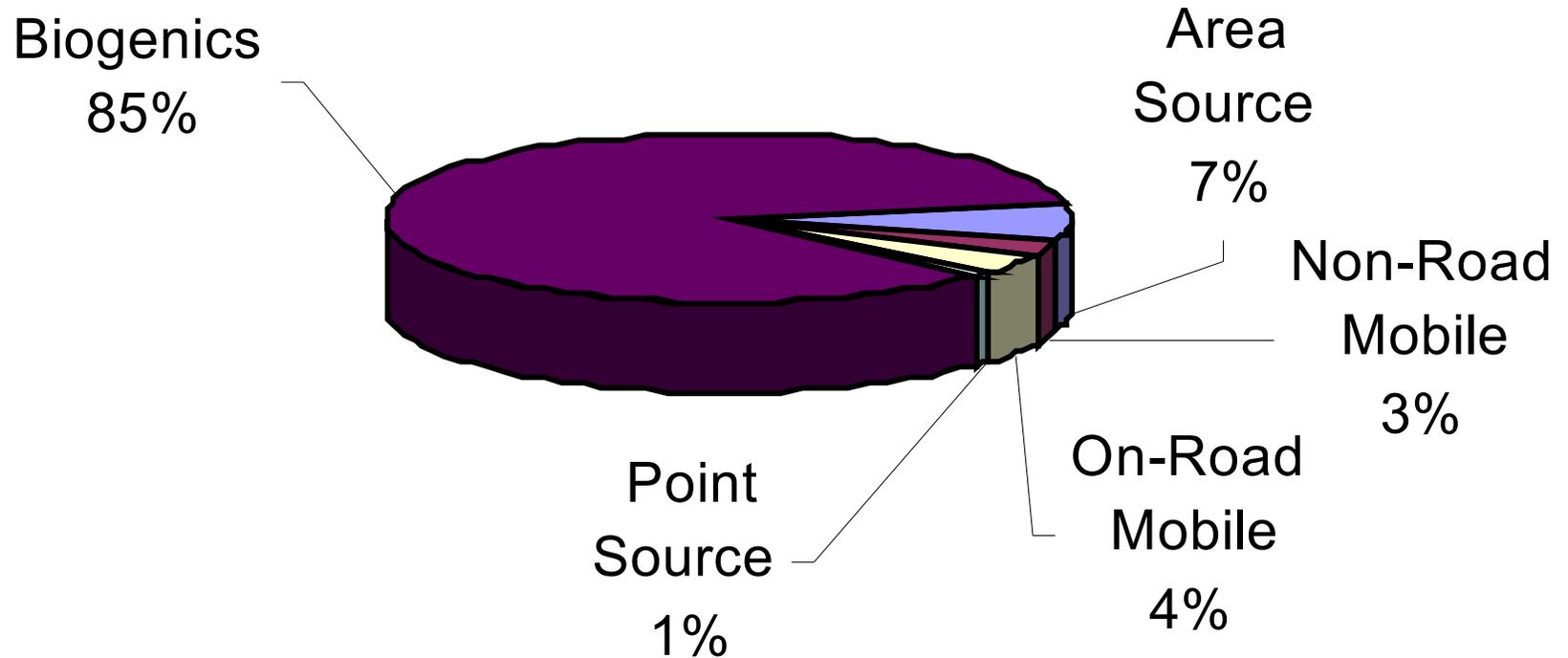
# Ozone (O<sub>3</sub>)

- Ground level ozone is the principle component of smog
- Sources - chemical reaction of volatile organic compounds (VOCs) and NO<sub>x</sub>
- Health hazard - reduced lung function, asthma, irritated eyes and nose, reduced resistance to illness, aging of lung tissue

# Volatile Organic Compound (VOC)

- Biogenics - naturally occurring from living organisms, vegetation, etc.
- Released from vehicle, gasoline vapors, solvents, industrial chemicals, etc.

# VOC Emissions Inventory

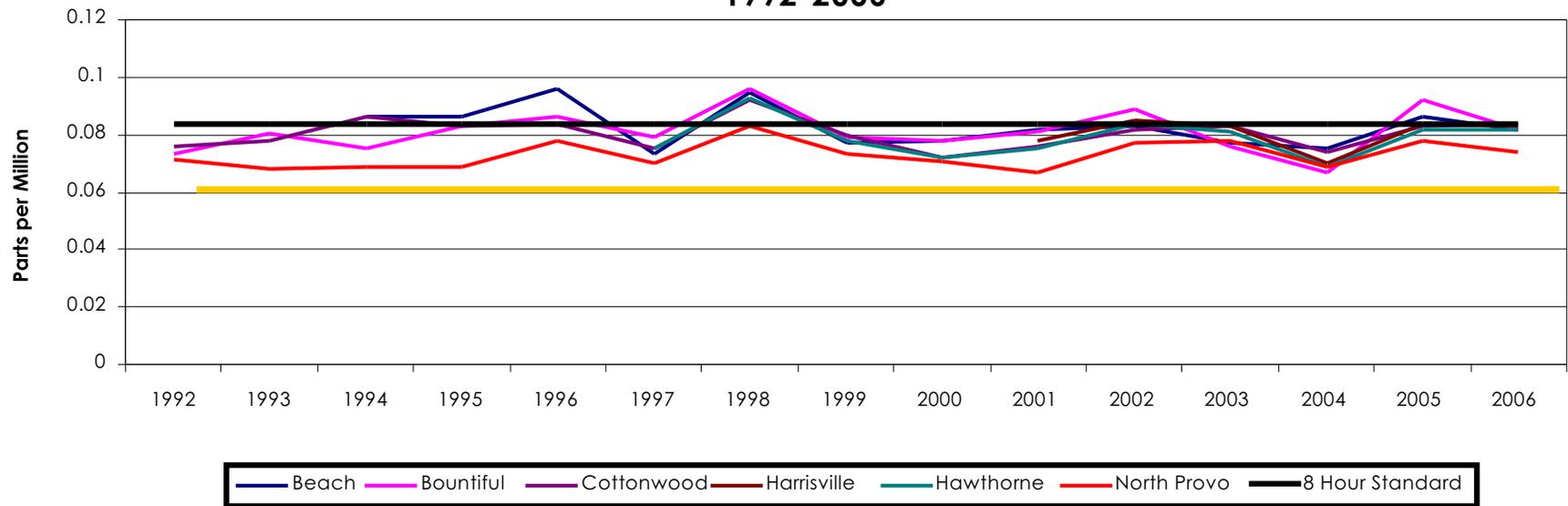


# How is Ozone is Formed



# Ozone

4th Highest 8-Hour Ozone Average  
1992-2006

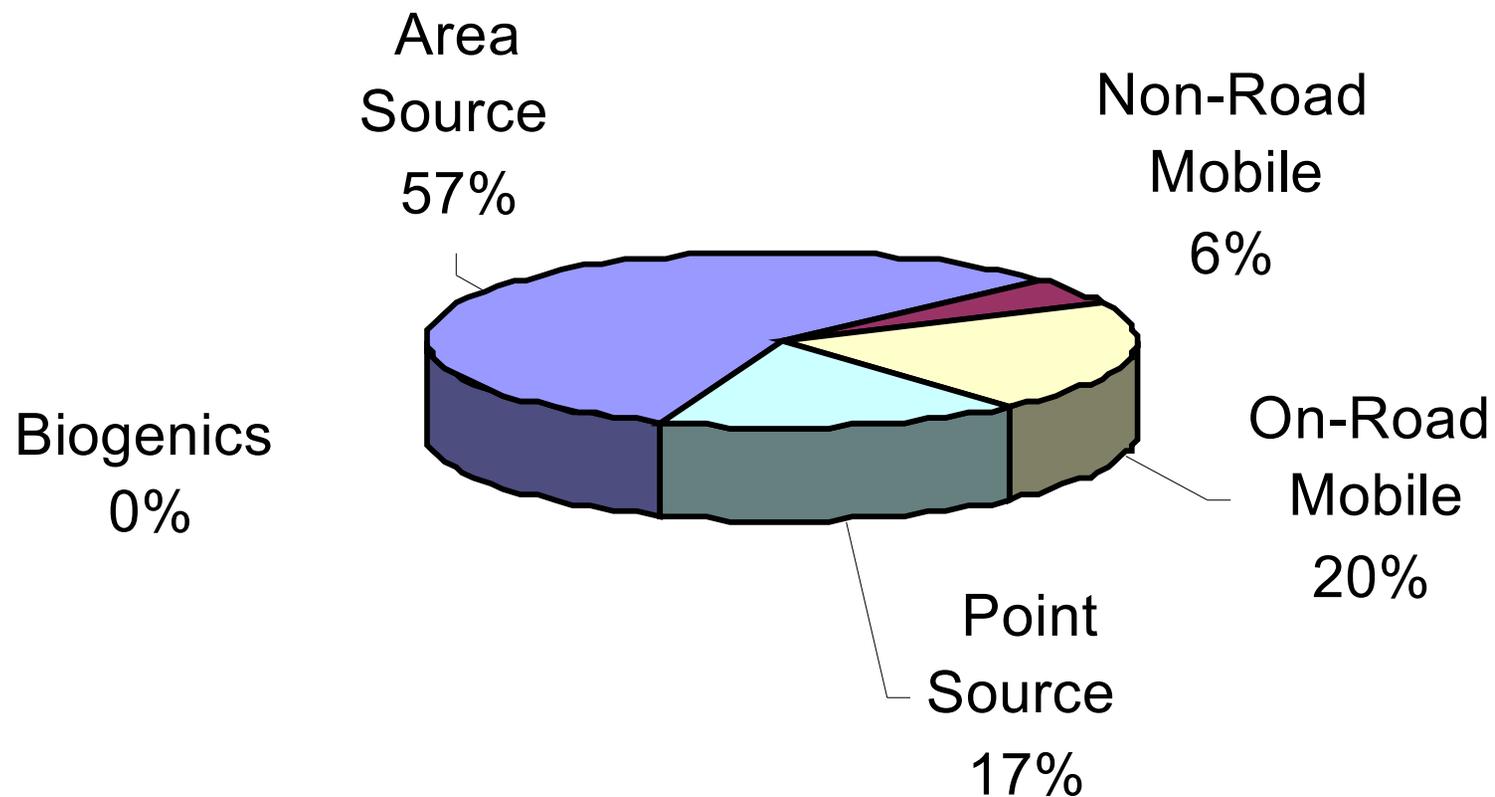


Proposed 2008 Standard

# Particulate Matter (PM<sub>10</sub> & PM<sub>2.5</sub>)

- Source - dust, smoke, soot
- Health hazard - cause nose and throat irritation, lung damage, bronchitis
- Main source of haze that reduces visibility

# PM<sub>2.5</sub> Emissions Inventory



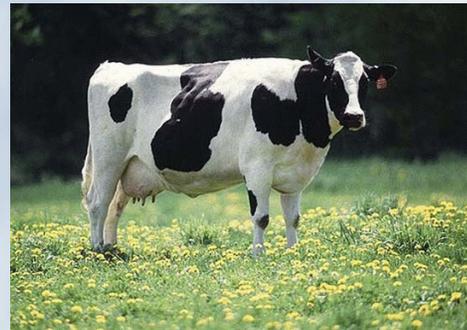
# How PM<sub>2.5</sub> is Formed



- Wintertime temperature inversions trap gasses in valleys, facilitating this reaction.

# How PM<sub>2.5</sub> is Formed

**(SO<sub>x</sub>) or (NO<sub>x</sub>) + Ammonia (NH<sub>3</sub>) = PM<sub>2.5</sub>**

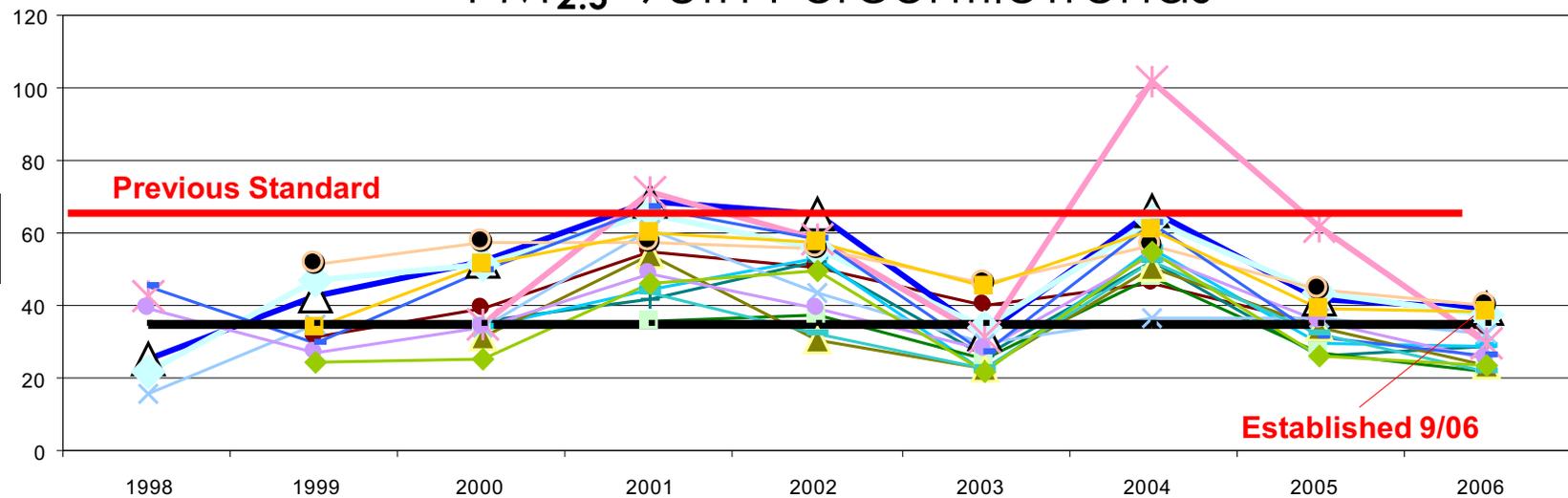


- **Wintertime temperature inversions trap gasses in valleys, facilitating this reaction.**

# Particulate Matter

(< 2.5 micrometers in diameter)

## PM<sub>2.5</sub> 98th Percentile Trends



- Bountiful
- △ Cottonwood
- ◇ Hawthorne
- ▲ Highland
- \* Logan
- North Salt Lake
- Spanish Fork
- West Valley

- + Brigham City
- Harrisville
- Herriman
- × Lindon
- North Provo
- Ogden
- ◆ Washington Terrace
- 24 Hour Standard is 35  $\mu\text{g}/\text{m}^3$

# Pollution Control Efforts

## State Solutions

- Reduce Mobile On-road Emissions
- Reduce Point Source Emissions
- Address Hazardous Air Pollutants